## REMARKS

This Amendment responds to the Office Action dated March 19, 2004 in which the Examiner rejected claims 3 and 5 under 35 U.S.C. §112 first paragraph, rejected claims 1-2 and 8 under 35 U.S.C. §102(b) and rejected claims 3-7 under 35 U.S.C. §103.

Attached to this Amendment is a copy of the priority document. Applicant respectfully requests the Examiner acknowledges the priority document.

As indicated above, claims 3 and 5 have been canceled without prejudice. Therefore, Applicant respectfully requests the Examiner withdraws the rejection to claims 3 and 5 under 35 U.S.C. §112 first paragraph.

As indicated above, claim 1 has been amended to stylistic reasons. The amendments are unrelated to a statutory requirement for patentability and do not narrow the literal scope of the claims.

Claim 1 claims a system for monitoring wavelength division multiplex channels in an optical signal. The system comprises a phase-array optical wavelength demultiplexer device, a phase control means, detector means and control means. The phase-array optical wavelength demultiplexer (phasar) device includes an input port for receiving an input optical signal, and an output port for transmitting an optical signal. The input and output ports are connected by a waveguide array. The phase control means is connected to receive a control signal and is operable to vary the effective optical length of each waveguide in the array, and such that the phase of optical signals passing through respective waveguides also vary in dependence upon that received control signal. The detector means is connected to receive the output optical signal from the phasar device, and is

operable to produce a detector signal relating to that output optical signal. The control means is connected to receive the detector signal, and is operable to supply the control signal to the phase control means, such that respective signals from desired ones of the multiplexed channels are output in turn from the phasar device to the detector means.

Through the structure of the claimed invention having a) a phase control means which varies the phase of optical signals passing through the waveguides and b) a control means which supplies a control signal to the phase control means such that respective signals from desired ones of the multiplex channels are output in turn from the phasar device to a detector means as claimed in claim 1, the claimed invention provides a system for monitoring wavelength division multiplex channels in an optical signal so that the wavelength of light going to a given output changes over a predetermined range. The prior art does not show, teach or suggest the invention as claimed in claim 1.

Claims 1-2 and 8 were rejected under 35 U.S.C. §102(b) as being anticipated by *Koga et al.* (U.S. Patent No. 5,617,234).

Applicant respectfully traverses the Examiner's rejection of the claims under 35 U.S.C. §102(b). The claims have been reviewed in light of the Office Action, and for reasons which will be set forth below, Applicant respectfully requests the Examiner withdraws the rejection to claim and allows the claim to issue.

*Koga et al.* appears to disclose a multiwavelength simultaneous monitoring circuit employing arrayed-waveguide grating preferably used as a wavelength meter in optical communication networks using wavelength division multiplexing (WDM) technologies, or as a wavelength discriminator in a stabilizing circuit for wavelength

division multiplexing optical sources. (col. 1, lines 8-14) FIG. 4 shows a configuration of a first embodiment of a multiwavelength simultaneous monitoring circuit. In this figure, a reference optical signal (wavelength .$\lambda_O$) and a WDM signal to be monitored (wavelength $\lambda_1$ -.$\lambda_n$) are inputted to a predetermined input waveguide of an AWG (Arrayed-Waveguide Grating) 12 after multiplexed by an optical coupler 11. The AWG 12 includes the following elements which are connected in this order: an input waveguide array 32 formed on a substrate 31; an input concave-slab waveguide 33; a waveguide array 34 including a plurality of waveguides which progressively become longer by a length difference ΔL, an output concave-slab waveguide 35; and an output waveguide array 36. The waveguide array 34 is provided with a heater 13 connected to a current source 15. The current source 15 is supplied with a reference signal Sa outputted from an oscillator 14, and controls the temperature of the heater 13 in response to the reference signal Sa. The output waveguides #0-#n of the AWG 12 are connected to photodetectors 16-0 and 16-i (i=1-n) as shown in FIG. 5A. The outputs of the photodetectors 16-0 and 16-i are connected to phase comparators 18-0 and 18-i through amplifiers 17-0 and 17-i, respectively. The phase comparators 18-0 and 18-i are provided with the reference signal Sa outputted from the oscillator 14, and their outputs are inputted to low-pass filters (LPFs) 19-0 and 19-i. The output of the low-pass filter 19-0 is supplied to an integrator 20-0. The output (wavelength error signal Sd) of the integrator 20-0 is fed to a temperature control circuit 21 that controls a Peltier cooler 22 for regulating the temperature of the AWG 12. (col. 6, line 38 through col. 7, line 2) Since the transmission characteristics of the AWG 12 is locked to the reference wavelength $\lambda_O$, error signals detected by the coherent detection in the phase comparators 18-1-18-n

correspond to the relative wavelength differences between the respective wavelengths $\lambda_1$-.$\lambda_n$ of the WDM signal and the center transmission wavelengths of the output waveguides #1-#n. (col. 9, lines 15-21) Thus, the multiwavelength simultaneous monitoring circuit of this embodiment can discriminate the wavelength errors of the WDM signal to be monitored at high accuracy by utilizing the highly accurate relationships between the center transmission wavelengths of the output waveguides of the AWG 12, and by locking one of the center transmission wavelengths to the reference wavelength $\lambda_O$. (col. 9, lines 42-48) FIGS. 22 and 23 are block diagrams showing a fifth embodiment of the multiwavelength simultaneous monitoring circuit. The fifth embodiment differs from the third embodiment shown in FIG. 14A in that the present embodiment obtains ratios between the outputs of two adjacent output ports rather than the differences between the two outputs as in the third embodiment. To achieve this in the present embodiment, the outputs of a pair of photodetectors 16-ia and 16-ib are supplied to the first and second input terminals of logarithmic amplifiers 40-i, respectively. Each of the logarithmic amplifiers 40-i converts the two input signals into log values, followed by obtaining the difference between the two, thereby outputting the ratio of the outputs of the pair of adjacent output ports as the wavelength error signal. The AWG 12 of the present embodiment is a 16.times.16 AWG, and the wavelength spacing between the center transmission wavelengths of adjacent channels is 1 nm. Accordingly, FSR (Free Spectral Range) is 16 nm. The input ports are assigned to eight central input ports of the AWG 12. The center transmission wavelengths of respective channels of the AWG 12 vary in accordance with the position of an input port of the multiplexed light of the WDM signal and the reference optical signal. (col. 14, lines 13-37)

Thus, *Koga et al.* merely discloses a temperature controller 21 which controls a Peltier cooler 22 for regulating the temperature of the arrayed-waveguide grating (AWG) 12. Nothing in *Koga et al.* shows, teaches or suggests a control means which supplies a control signal such that respective signals from desired ones of the multiplex channels are output in turn from a phasar device to a detector means as claimed in claim 1. In other words, as claimed in claim 1, a scanning function is provided so that the wavelength of the light going to a given output of a demultiplexer changes over a predetermine range. However, *Koga et al.* merely discloses a temperature control circuit 21 that controls a cooler 22 for regulating the temperature of a AWG 12.

Additionally, *Koga et al.* merely discloses a cooler 22 for regulating the temperature of the AWG 12. Nothing in *Koga et al.* shows, teaches or suggests a phase control means which varies the effective optical length of <u>each</u> waveguide in an array <u>to vary the phase of optical signals</u> as claimed in claim 1. Rather, *Koga et al.* merely discloses a cooler 22 for regulating the temperature of the entire AWG 12.

Since nothing in *Koga et al.* shows, teaches or suggests a) a phase control means varying the effective optical signals of each waveguide such that the phases of the optical signals also vary and b) a control means which supplies a control signal to the phase control means such that respective signals from desired ones of the multiplex channels are output in turn from the phaser device to the detector means, as claimed in claim 1, Applicant respectfully requests the Examiner withdraws the rejection to claim 1 under 35 U.S.C. §102(b).

Claims 2 and 8 depend from claim 1 and recite additional features. Applicant respectfully submits that claims 2 and 8 would not have been anticipated by *Koga et*

*al.* within the meaning of 35 U.S.C. §102(b) at least for the reasons as set forth above. Therefore, Applicant respectfully requests the Examiner withdraws the rejection to claims 2 and 8 under 35 U.S.C. §102(b).

Claims 3-5 were rejected under 35 U.S.C. §103 as being unpatentable over *Koga et al.* in view of *Podoleanu et al.* (U.S. Patent No. 5,975,697). In addition, claims 5-7 were rejected under 35 U.S.C. §103 as being unpatentable over *Koga et al.* in view of *Weber* (PCT WO99/12297).

Applicant respectfully traverses the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for reasons which will be set forth below, Applicant respectfully requests the Examiner withdraws the rejection to the claims and allows the claims to issue.

As discussed above, since nothing in *Koga et al.* shows, teaches or suggests the primary features as claimed in claim 1, Applicant respectfully submits that the combination of the primary reference with the secondary references will not overcome the deficiencies of the primary reference. Therefore, Applicant respectfully requests the Examiner withdraws the rejection to claims 4 and 6-7 under 35 U.S.C. §103.

The prior art of record, which is not relied upon, is acknowledged. The references taken singularly or in combination do not anticipate or make obvious the claimed invention.

Thus, it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is requested contact, by telephone, the Applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the current set shortened statutory period, Applicant respectfully petitions for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

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By: ______________________
Ellen Marcie Emas
Registration No. 32,131

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620